

# Compact High Sensitive Laser-Induced Breakdown Spectroscopy Instrument, Phase I

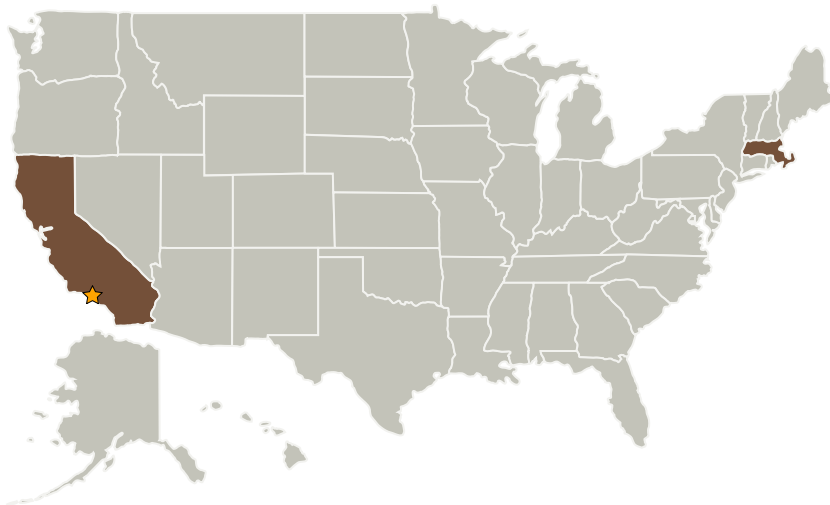
Completed Technology Project (2006 - 2006)



## Project Introduction

Laser induced breakdown spectroscopy (LIBS) is a versatile tool for in situ substance characterization. Existing LIBS instruments are not compact enough for space applications. Major obstructs for miniaturization are from: high voltage Q-switch based pulse laser, inefficient light collection system and bulky high sensitive array-detection. Based on a revolutionary low-voltage Q-switch technology and high efficient laser delivery and light collection scheme, Boston Applied Technologies proposes to develop an ultra-compact high sensitive LIBS instrument for NASA application. The laser featured fast and dual-pulse Q-switch with low switching voltage, ultra reliable fiber-ring cavity design, and high efficient laser-diode pumping. The low switching voltage also brings the advantage of reducing the complexity of the electronic driver design, which is a big chunk in existing electro-optical or acoustic-optic Q-switching lasers. The required ablation energy can be significantly reduced due to high efficiency of the proposed system. The resultant LIBS instrument will be compact, cost-effective and reliable. It will be capable of withstanding operation in space and planetary environmental extremes, which include temperature, pressure, radiation, and impact stresses.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Boston Applied Technologies, Inc.	Supporting Organization	Industry Minority-Owned Business	Woburn, Massachusetts

## Primary U.S. Work Locations

California	Massachusetts
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.1 Detectors and Focal Planes